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REMARKS

In the October 5th, 2001 Office Action, the Examiner objected that the current case fails to meet sequence rules because no CRF has been submitted.

Claims 16-24 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter applicant regards as the invention.

Claims 16-26 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent Number 6,051,377 in view of either Zavracky *et al.* (U.S. Patent Number 4,989,934) or Nova *et al.* (U.S. Patent Number 5,751,629) ("Nova '629").

Claims 16-22 and 25-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nagai *et al.* (JP 04148700 A2) in view of Nova '629. Claims 16-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nagai *et al.* (JP 04148700 A2) in view of Nova '629 and further in view of Kobayashi *et al.* (Mol. Cell. Probes (June 1995) 9:175-182).

OBJECTIONS.

Sequence Listing

Please enter the attached statement to support the use of a computer readable form from a previous application in accordance with 37 C.F.R. §1.821(e).

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REJECTIONS.

Obvious-type double patenting.

With regard to the rejection of claims 16 - 26 under the judicially created doctrine of obviousness-type double patenting, Applicant has cancelled claims 16-26.

Rejection under 35 U.S.C. §103(a).

With regard to the rejection of Claims 16-22 and 25-26 under 35 U.S.C. §103(a) as allegedly obvious over Nagai *et al.* in view of Nova '629 and of Claims 16-26 under 35 U.S.C. §103(a) as allegedly obvious over Nagai *et al.* in view of Nova *et al.* and further in view of Kobayashi *et al.*, Applicant has cancelled claims 16 - 26 and respectfully requests that the Examiner enter new claims 31 - 44. No new matter has been introduced into this application by reason of the new claims presented herewith. The new claims are supported by the following references to the Specification and Drawings.

Independent claim 31 and dependent Claim 32 are directed to a method of determining the sequence of a target nucleic acid in a sample using a solid-phase particle having a light-powered transponder and an oligonucleotide probe attached to the particle surface. A solid phase particle comprising of a light-powered transponder and an oligonucleotide probe is described in the specification on page 11, lines 8 – 21. Methods of attaching oligonucleotide probes to solid phase particles are described in the specification on page 5, lines 36-38 to page 6, lines 1-28. A method of determining an nucleic acid sequence

using solid-phase particles containing transponders is described in Examples 2-4.

Dependent Claims 33-36 are directed to the labeling of target nucleic acid with a fluorescent label. Such methods are described in the specification on page 5, lines 19-35 and page 7, lines 8-29.

Dependent Claims 37-38 are directed to methods of pre-treatment of target nucleic acid. Such methods are described in the specification on page 5, lines 5-18.

Dependent Claims 39-40 are directed to the types of data contained in the transponder memory elements. Encoding of the transponder memory elements is described in the specification on page 4, lines 26-32.

Independent claim 41 and dependent Claim 42 are directed to a method of determining the sequence of a target nucleic acid in a sample using multiple populations of solid-phase particles containing transponders. Such a method is described in the specification in Example 4.

Dependent Claims 43-44 are directed to methods of pre-treatment of target nucleic acid. Such methods are described in the specification on page 5, lines 5-18.

Dependent Claim 45 is directed to a method of determining the sequence of a target nucleic acid in a sample using solid phase particles having a glass, latex or plastic surface. Such particles are described in the specification on page 12, lines 8-15.

Dependent Claim 46 is directed to a method of determining the sequence of a target nucleic acid in a sample where the oligonucleotide probe is single-stranded. A single-stranded oligonucleotide probe is described in the specification in Example 2.

The Nova '629 patent does not disclose a method of determining the sequence of a target nucleic acid in a sample employing a transponder using one light source to power the transponder photovoltaic cells and as a means of inducing fluorescence from a fluorescent label reagent attached to the surface of the solid phase. A "multianalyte immunoassay" is described in the Nova '629 patent (specification column 34, line 1 to column 35, line 19). However, here, laser light is used only to excite fluorescence from a labeled antibody on the surface of the solid phase. A radio-frequency signal is used to provide power for the transponders and to decode the transponders.

Applicant's specification discloses for the first time the advantages of using a light source to power the transponder photovoltaic cells and as a means of inducing fluorescence from fluorescent label reagents attached to the surface of the solid phase. Apart from eliminating the need for a radio-frequency transmitter, narrowly focused light, such as laser light, enables only one transponder to be active at a time during the decoding process, significantly reducing the noise level. (See Applicant's specification, page 12, lines 16 – 22.)

In reply to the Office Action dated October 5th, 2001, favorable reconsideration and allowance of this application are respectively requested for the reasons set forth in the above remarks. Attached hereto is a

marked up version of the changes made to the claims and the minor corrections to the Specification and Drawings listed above. If, for any reason, the Examiner is unable to allow the application on the next Office Action and feels that an interview would be helpful to resolve any remaining issues, he is respectfully requested to contact the undersigned attorney at (312) 321-4229.

Claims 27 – 46 are pending. Claims 27 – 30 are withdrawn from consideration.

Respectfully submitted,

Dated: MAR 6th, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE.

Specification

In a preferred design, depicted in Fig. [4] 7, a metal coil antenna 30 is wrapped around the flow cell 32 of a flow cytometer 29. The transponders 12 pass through the flow cell 32, and are decoded by the scanner device 27. The signal carrying the data sent from the transponders 12 is amplified by a first amplifier 34 and processed by the scanning device 27. As the transponders 12 are decoded, fluorescence from the transponders 12 is detected and analyzed by the flow cytometer 29.

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Claims

31(new). A method of determining the sequence of a target nucleic acid in a sample, comprising the steps of:

(a) providing at least one solid phase particle having a transponder, the particle having an oligonucleotide probe attached directly or indirectly to an outer surface, and the transponder comprising of memory elements containing data indicating the sequence of the oligonucleotide probe, a radio-frequency transmitter and a photovoltaic cell providing a source of electrical power for the memory elements and transmitter when illuminated by light;

(b) contacting the solid phase particle with the sample to form a sample mixture;

(c) providing conditions allowing annealing of at least a portion of the sequence of the target nucleic acid to a complementary sequence on the oligonucleotide probe;

(d) illuminating the solid phase particle with the light to detect the presence of a fluorescent label indicative of binding of at least a portion of the sequence of the target nucleic acid to the oligonucleotide probe; and

(e) decoding the data on the memory elements to identify the sequence of the oligonucleotide probe.

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32(new). The method of claim 31, further comprising analyzing the sequence of the oligonucleotide probe to which target nucleic acid is bound to determine at least a portion of the sequence of the target nucleic acid.

33(new). The method of claim 31, wherein the fluorescent label is bound to the target nucleic acid.

34(new). The method of claim 31, wherein the fluorescent label is added after the annealing step through a chain extension reaction using DNA polymerase.

35(new). The method of claim 34, wherein the fluorescent label is incorporated into the oligonucleotide probe.

36(new). The method of claim 34, wherein the chain extension reaction is performed with at least four dye-labeled deoxynucleotide triphosphates, each dye-labeled deoxynucleotide triphosphate having a different fluorescence emission from the others.

37(new). The method of claim 31, wherein the target nucleic acid is pre-treated before contacting the solid phase particle with the sample.

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38(new). The method of claim 31, wherein the target nucleic acid is pre-treated after contacting the solid phase particle with the sample.

39(new). The method of claim 31, wherein the data comprise the sequence of the oligonucleotide probe.

40(new). The method of claim 31, wherein the data comprise characteristics of the sample.

41(new). A method of determining the sequence of target nucleic acid thought to contain a plurality of subsequences, comprising the steps of:

(a) providing at least two populations of solid phase particles, each particle comprising an oligonucleotide probe corresponding to one of the subsequences, attached directly or indirectly to an outer surface of the particle, and a transponder comprising memory elements containing data indicating the sequence of the attached oligonucleotide probe, a radio-frequency transmitter and a photovoltaic cell providing a source of electrical power for the memory elements and transmitter when illuminated by light; wherein a first population of solid phase particles has a different oligonucleotide probe sequence than a second population of solid phase particles;

(b) combining the sample and the at least two populations of the solid phase particles;

(c) providing conditions allowing annealing of at least a portion of the sequence of the target nucleic acid to complementary sequences on the oligonucleotide probes;

(d) illuminating the solid phase particles with the light to detect the presence of a fluorescent label indicative of binding of at least a portion of the target nucleic acid to the oligonucleotide probes; and

(e) decoding the memory elements to identify the sequence of the oligonucleotide probes.

42(new). The method of claim 41, wherein the solid phase comprises at least three populations of solid phase particles, each particle having a transponder and having an oligonucleotide probe corresponding to one of the subsequences attached to its surface, and each of the populations having a different oligonucleotide probe sequence.

43(new). The method of claim 41, wherein the target nucleic acid is pre-treated before contacting the at least two populations of solid phase particles with the sample.

44(new). The method of claim 41, wherein the target nucleic acid is pre-treated after contacting the at least two populations of solid phase particles with the sample.

45(new). The method of claim 41, wherein the surface of the solid phase particles is glass, latex or plastic.

46(new). The method of claim 41, wherein the oligonucleotide probe is single-stranded.